Comparison of True versus Apparent Survival in patients with Metastatic Non-Small Cell Cancer treated in the Real-World Setting

Anupama Vasudevan , Bill Saunders , Sandy English , Prateesh Varughese , Robert E. Smith
PQ, Integra Connect, West Palm Beach, FL, USA

Background

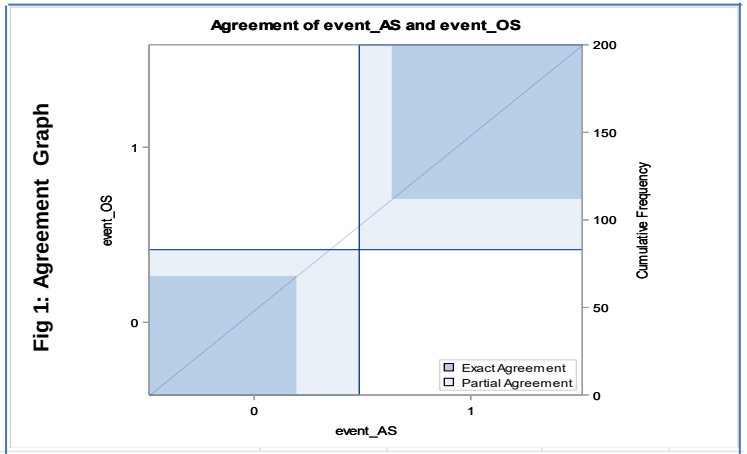
Privacy and confidentiality must be observed when conducting research utilizing electronic health records (EHR). In instances where reidentification may happen, it becomes critical to utilize a logic for determining the vital status of the patient, a key clinical outcome. This study aimed to understand the survival measures obtained by calculating the vital status based on the proof of life method (Apparent Survival) and by using date of death (Overall Survival).

Methods

- Adult metastatic non-small cell cancer (mNSCLC) patients who initiated treatment between 01-Jan-2018 and 30-Sep-2021 and followed up through 28-Feb-2022.
- The index date was 1L treatment initiation.
- Apparent survival (AS): Patients were considered alive if the last visit was recorded within the last 60 days of the data cutoff. Else, they were noted as apparent death with date of death imputed as last visit date+30days.
- Overall Survival (OS): Calculated using the actual month of death
- Kappa statistic was calculated to assess the Interrater agreement
- Sensitivity and Specificity values were calculated to assess predictive validity.
- A retrospective study including real world data from community oncology practices with detailed information combining EHR, chart reviews, and lab data was conducted.

Results

- 3,949 mNSCLC patients who initiated 1L treatment were included.
- Median age was 70 (27,89) years with 50.7% being male and 57% being white.
- Median (95% CI) AS was 9.1 (8.6,9.8) months and OS was 12.2 (11.3,12.9) months.
- Median AS underestimated the survival when compared to the OS, even when stratified by gender.
- Interrater agreement between the survival status by both methods was substantial
  - Kappa statistic (0.61, 95%CI:0.58,0.63)
  - Sensitivity and specificity values (95% CI) being 0.98(0.975-0.987) and 0.59(0.56,0.61), respectively



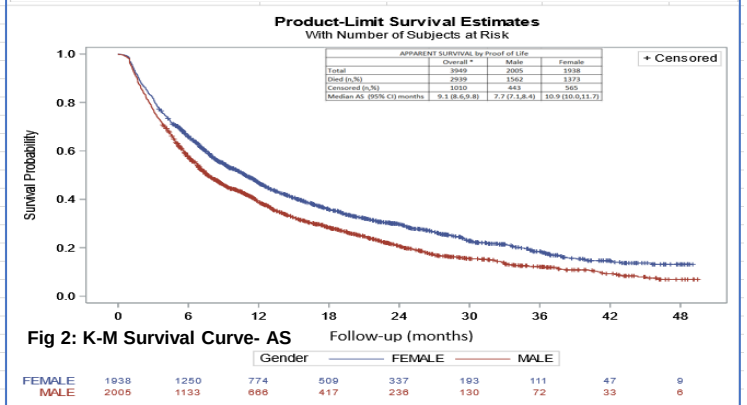


Fig 2: K-M Survival Curve- AS

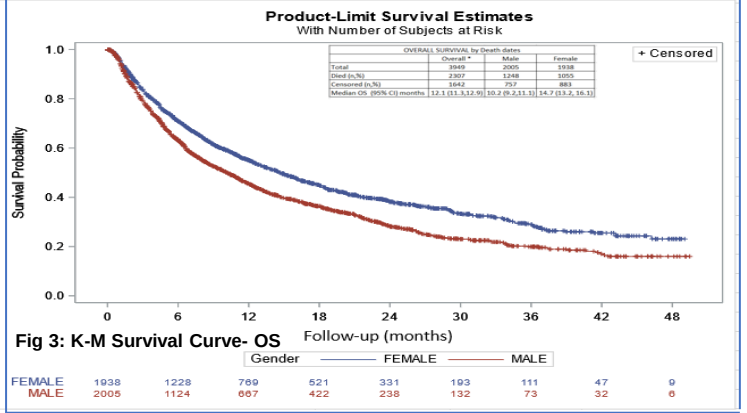


Fig 3: K-M Survival Curve- OS

Table 1: Demographics and Baseline Characteristics

	Overall* (n=3949)	Male (n=2005)	Female (n=1938)
Median Age (range)	70 (27,89)	70 (30,89)	70 (27,89)
Race			
White	2250 (57)	1141 (56.9)	1104 (57)
Black or African American	281 (7.1)	137 (6.8)	144 (7.4)
Asian	47 (1.2)	23 (1.2)	24 (1.2)
Other	1371 (34.7)	704 (35.1)	666 (34.4)
Histology			
Nonsquamous	1670 (42.3)	903 (46.6)	762 (38)
Squamous	405 (10.3)	146 (7.5)	258 (12.9)
Other	145 (3.7)	57 (2.9)	88 (4.4)
Unknown	1729 (43.8)	832 (42.9)	897 (44.7)
ECOG at LOT 1 initiation			
0	726 (18.4)	374 (18.7)	350 (18.1)
1	1363 (34.5)	695 (34.7)	667 (34.4)
2	563 (14.3)	282 (14.1)	279 (14.4)
3	129 (3.3)	66 (3.3)	63 (3.3)
4	8 (0.2)	3 (0.2)	5 (0.3)
Not reported	1160 (29.4)	585 (29.2)	574 (29.6)
LOT 1 Treatment categories			
Chemo+IO	1953 (49.5)	1046 (52.2)	903 (46.6)
IO	886 (22.4)	422 (21.1)	463 (23.9)
Chemo	702 (17.8)	395 (19.7)	307 (15.8)
TKI	408 (10.3)	142 (7.1)	265 (13.7)

*Includes all patients (6 patients with no gender reported)

Survival was underestimated by proof of life algorithm (Apparent Survival)

Conclusion

- This study highlights that OS calculated using death dates remains a gold standard and continued research into AS is warranted given the difficulty to obtain OS in some data sources.
- Patients who may have been transferred to hospice or a different practice would have been considered as dead by AS.
- Further, AS estimates may be similar to the OS estimates in aggressive cancer types, which needs to be explored.
- AS is to be utilized where privacy may be compromised but has to be treated with caution

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